U.S. Department of Transportation
Federal Aviation Administration

Subject:	INFORMATION: Interim Summary of Policy and Advisory Material Available for Use In the Certification of Cabin Mounted Video Cameras Systems with Flight Deck Displays on Title 14 CFR Part 25 Aircraft	Date:	October 5, 2001
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1. BACKGROUND/PURPOSE

This memorandum provides a summary of policy and advisory material that should be applied when certifying cabin mounted video camera (CMVC) systems with flight deck display of the video image on Title 14 *Code of Federal Regulations* (CFR) part 25 aircraft. As a result of the terrorist attacks on the United States on September 11, 2001, Aircraft Certification Offices (ACOs) may see an increase in the number of requests to certify CMVC systems that allow the flightcrew to monitor activity in the cabin. Aircraft Certification Offices should apply the policy and advisory material summarized in this memorandum to new and amended type certificate and supplemental type certificate (STC) certification programs immediately. This memorandum will ensure a standardized approach in CMVC system certification independent of ACO or Designated Alteration Station(DAS) geographical location. This memorandum may be revised as the need arises.

A CMVC system is classified as miscellaneous, non-required electrical equipment. As such there is available policy and advisory material available for FAA certification engineers, FAA designees, and FAA delegated organizations (e.g., DAS) to utilize when defining certification requirements and developing acceptable methods of compliance with the requirements.

2. ELECTRICAL INSTALLATION ISSUES ASSOCIATED WITH INSTALLATION OF CMVC SYSTEM

Advisory Circular (AC) No. 25-10, *Guidance for Installation of Miscellaneous, Non-required Electrical Equipment*, and AC 25-16, *Electrical Fault and Fire Prevention and Protection*, provide methods of compliance for the installation of a CMVC system. Some of the key points contained in these ACs are:

a) In accordance with § 25.1301, the CMVC system must be of a kind and design appropriate to its intended function, and must function properly when installed. The key words to understand the intent of this regulation are "appropriate" and "properly," as they relate to airworthiness. To be "appropriate" means that the equipment is used in a manner for which it was designed. To function "properly" means that the CMVC system cannot interfere with the ability of the airplane and flightcrew to continue safe flight, landing, and egress.

b) The CMVC system components and wiring should meet the flammability requirements of § 25.853 and § 25.869. The use of "earlier" wire (as defined in AC 25-16, e.g., PVC wire) may not be used unless it is part of the original type basis for the airplane.

c) CMVC system wire should be installed in accordance with the wiring standards established by the original airplane manufacturer.

d) An electrical load analysis, based on the most recent electrical load configuration for the airplane, should be accomplished in accordance with § 25.1351(a).

e) CMVC system wiring should be protected by appropriately rated and coordinated circuit breakers in accordance with § 25.1357.

f) System separation should not be compromised by the installation of the CMVC system(reference § 25.1353(a)).

g) Required instrument systems should not be compromised by the installation of the CMVC system (reference § 25.1333(c).

h) Laboratory, ground, and flight testing for electromagnetic interference should be accomplished.

In addition, the concepts contained in Policy Memorandum No. 00-111-160, *Interim Policy Guidance for Certification of In-Flight Entertainment Systems on Title 14 CFR Part 25 Aircraft*, apply to CMVC systems, particularly the following:

i) The CMVC system should be connected to an electrical bus that does not supply power to airplane systems that are necessary for continued safe flight and landing. System designers should be encouraged to select lower level electrical busses (e.g., utility, galley, ground service bus, etc.).

j) A means should be provided for the flightcrew to manually disconnect the CMVC system from its source of power. The removal of power should occur as close to the bus supplying power as possible. The disabling/deactivating of component outputs is not considered an acceptable means to remove power (i.e., disabling/deactivating the output as opposed to removing input power to the system). Note: The ability to remove CMVC system power should not be provided outside of the flight deck (i.e., no control of the CMVC system within the passenger cabin).

k) Reliance on pulling system circuit breakers (CBs) as the sole means to remove CMVC system power is not acceptable. The use of a CB as a switch will degrade the CBs ability to trip at its rated current trip point.

l) The design and installation of the CMVC system should be such that impact upon operational procedures is minimized. However, the airplane flight manual (AFM) must address any changes to normal, non-normal, and emergency procedures that are due to the installation of the CMVC system.

m) 14 CFR § 25.1529, Instructions for Continued Airworthiness, should be addressed.

3. FLIGHT DECK HUMAN FACTORS ISSUES ASSOCIATED WITH INSTALLATION OF CMVC SYSTEM (TO ALLOW VIEWING OF CABIN BY FLIGHTCREW)

The primary issue is to ensure that installation does not compromise usability of existing systems.(NOTE: This list does not contain any requirements related to the intended function of the camera system itself.)

There are two categories of installations to be considered:

a) **Standalone**

The first category is a separate video display that is not integrated with existing approved, essential flight deck display systems. This category also includes installations that use the video display unit associated with other non-required, non-safety-related displays (e.g., maintenance displays).

Issues associated with standalone installations: These issues result from the installation of new controls and displays in the flight deck.

i) §25.773(a)(2) Ensure that the video display unit does not produce unacceptable glare or reflections on the existing essential/critical displays or on the flight deck windows, under all expected lighting conditions. This is more important for a display system that is intended to be operational at all times; it is less significant if the system is expected to be turned on only when needed.

ii) §25.777(a) Ensure that the installation does not place the controls for the camera system in locations that may result in inadvertent operation of other controls (i.e., when the pilot reaches for the camera control it is likely that some other control may be "bumped" and repositioned).

iii) §25.785(g) Since this system is likely to be needed a number of times during a flight, ensure that the pilots can operate/view any controls and displays (that are to be used in flight) while seated with the seat belt and shoulder harnesses fastened.

iv) §25.1523 The use of the system, in accordance with the proposed operating procedures, should not result in pilot distraction or workload that may unacceptably compromise pilot performance of other required tasks. If the system provides audio in additional to video, that audio should not interfere with required pilot communication, nor should it interfere with the detection and identification of aural alerts.

b) **Integrated**

Systems in which the video/audio from the cabin camera is routed to existing approved, essential/critical displays (e.g., main panel multifunction displays, FMS control/display units,) and/or the audio system.

Issues associated with integrated installations: In such installations, it is expected that the issues above will be less significant (even though they are applicable), because such an installation is likely to use previously approved controls and/or displays. In addition, the following issues should be considered:

i) §25.1301(a) The camera system and its use should not interfere with the intended function and use of other essential/critical functions with which it shares displays and/or controls (e.g., viewing the video from the camera should not prevent or unacceptably interfere with the display of other required information, such as flight or navigation data).

ii) §25.777(a), §25.1555(a) Integration of the camera system controls and displays should not result in confusion in the labeling or operation of other required systems. (e.g. the nomenclature of control functions should not be similar to existing nomenclature to the extent that confusion could result).

Questions regarding this memorandum should be directed to Mr. Stephen Slotte (electrical), or Mr. Stephen Boyd (human factors/flightcrew interface), both of the Airplane and Flightcrew Interface Branch, ANM-111.

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